Active Physician **Participation** Key to Smooth MOE/MAR Rollout

Peter G. Rossos, Howard Abrams, Robert Wu and Peter Bray

Introduction

For UHN, it was clear from the beginning that the MOE/MAR implementation would only be successful if there were widespread acceptance of medication order entry by front-line clinical staff. Otherwise, this bold initiative would end in abject failure. Fundamental to the project's success was acceptance of MOE/MAR by UHN's physicians. Many physicians questioned whether MOE/MAR would impede their ability to care for their patients. At this stage, there was still uncertainty whether CPOE (Computerized Physician Order Entry) "did more good than harm." By constantly revising the system and by recruiting some key individuals that would act as MOE/MAR "champions" and advisors, resistance to the project decreased. The following article examines the implementation of MOE/MAR from the physicians' perspective.

Physician Support

To ensure physician adoption, UHN presented MOE/MAR as a patient safety initiative from the beginning. The prior failure of the CPOE initiative by physicians at Cedars-Sinai Medical Center in Los Angeles is well documented and created a cloud of doubt for future CPOE efforts elsewhere. Physician concerns related to patient safety and workflow resulted in a lack of cooperation that scuttled that institution's CPOE project (Wachter 2006). The project was withdrawn when many physicians threatened to leave en masse. The failure at Cedars-Sinai provided a useful lesson as UHN MOE/MAR supporters developed their implementation plans.

In addition, the UHN had a history of successful Hospital Information System (HIS) and CPOE implementation. An HIS was first introduced in 1986 at the Toronto Western Hospital and subsequently adopted enterprise wide. Over the ensuing years additional modules were added and specialized systems were integrated into the HIS. The hospital physicians became familiar with performing an increasing number of their clinical care tasks on-line including laboratory and diagnostic imaging order entry and review. Given this reality, it was reasonable for the Project Team initiating UHN's MOE/MAR to propose that MOE is the next step in CPOE and would meet with acceptance by physicians.

However, from the physicians' point of view, the MOE/MAR initiative came with two major challenges that required the attention of the project team before MOE/MAR would eventually emerge as a success.

Challenge One

Although physicians were generally pleased with the existing hospital system, they were concerned about the added time required to place electronic medication orders. In most cases, it is quicker to write an order on paper, "flag" it in the chart and then simply walk away as opposed to sitting in front of a computer terminal to log in, find the right patient e-chart, enter an order, review the order and then submit it. Physicians are generally under significant time pressure and the prospect of committing extra time to a system that has them function as glorified "data-entry clerks" was not appealing. Furthermore,

a device strategy was required to support the portability of medication ordering during ward rounds and patient conferences away from the nursing station.

Challenge Two

Ordering medications on-line is very different from ordering laboratory or imaging tests. How doctors do this directly reflects the different ways they practise. There are often several different ways to order drugs, and the "best way" for a particular patient frequently elicits debate among physicians. When it comes to medications, the stakes are much higher than with labs, medical imaging and diets, where there is likely little or no harm done if a duplicate test is ordered or if a mistake is made. With drugs, an error such as prescribing the wrong drug – or the wrong dosage – can be dangerous or even fatal. Thus, a physician is more committed to his or her – often idiosyncratic, albeit comfortable – way of doing things. Faced with these challenges, it was fortuitous that the MOE/MAR project was launched at a time in which patient safety was getting increased attention both within UHN and in the broader medical community.

Pilot Test Lessons Helped Shape Rollout Methodology

As described in detail in "Implementing MOE/MAR: Balancing Project Management with Change Management" (see p. 27 in this issue), a pilot test of the medication order entry system would be conducted within a single hospital service due to the complexity of the project and the potential impact that on-line medication management would have on traditional clinical workflow. The General Internal Medicine (GIM) ward was selected as the test site since electronic order entry was already well supported by the physicians on this unit. In addition, the diversity in the types of medications ordered on the unit, along with drug monitoring and multiple stop/change orders, provided an excellent testing environment.

The Project Team discovered that it was not the complexity of the clinical care area that determined the difficulty of converting a group to MOE/MAR; instead, it was the practice patterns of the physicians and their availability to interact with nurses and pharmacists at the point of care in solving problems with workflow and system usability. Although medication order entry on surgical units is often less complex, implementation may be more challenging due to the fact that surgeons are generally in the operating rooms during the day, and typically available on the wards for only very short periods such as early morning rounds; they are usually not immediately available to work with nurses or pharmacists to resolve drug order problems. Verbal and telephone orders are more common on these services, increasing the workflow impact of direct CPOE. For these reasons, most surgeons did not initially want to commit to performing "clerical tasks" at the expense of an operating procedure. With these considerations the Project Team decided not to include surgical units in the pilot.

After much preparation with the clinical and Project teams, an initial pilot was launched in February 2003. It was stopped after a few weeks due to technical and workflow limitations. The major technical problem was related to an unanticipated load on the system resulting in response times that made the application unusable. From a physician workflow perspective, the interface was cumbersome and not intuitive. Furthermore, the SARS crisis in Toronto complicated the clinical environment. Although the initial pilot failed to lead directly to implementation, it provided many valuable lessons for the Project Team regarding the needs of physicians and how to engage them for subsequent re-introduction of MOE.

Physician Engagement Key to MOE/MAR Success

The initial pilot revealed that direct physician input into the interface was required to meet the needs of the physicians and reduce training requirements. With the help of the physicians, test scenarios and scripts were created to validate the order entry functionality for common clinical practices. A process of clinical engagement consisting of a review of medication order entry requirements, creation of common orders and customized order sets was implemented. A number of clinical safety, best practice and workflow issues were systematically addressed. In many cases CPOE ultimately offered both workflow advantages to the clinician and the ability to remotely order medications away from the hospital ward. A sign-off process by physicians regarding system design was required prior to implementation.

Creating templates of the common post-operative medications (known as "order sets") also played a key role in defining system usability. Prior to MOE/MAR, many surgical specialties had pre-printed order sets or "care maps" that were used following certain operative procedures or diagnoses. Identifying and implementing these order sets electronically was an important part of configuring MOE/MAR prior to go-live. Having these orders readily available to surgeons on-line as pre-built "typical orders" minimized the workflow change associated with the MOE/MAR transition and made the order entry process faster. This meant common medications could be easily ordered from a familiar list with appropriate mouse clicks.

One source of frustration that contributed to physicians' resistance to the pilot implementation was the excessive number of alerts generated by the clinical decision support functionality initially implemented within the system. Subsequent analysis showed that few of the drug-allergy and drug-drug interaction alerts actually provided any useful information (from the physician perspective). Most were just seen as nuisances, slowing physicians down at a time when they were trying to learn the system.

As a result, the alert mechanism was initially adjusted so

that only critical drug-drug interactions would trigger an alert. Over time, as the physicians continued to get more familiar with MOE/MAR, additional alerts were added to further improve patient safety.

Changing the Way Physicians Work

In the beginning, neither the Project Team nor Medical Informatics group realized how complex and difficult the MOE/MAR project would be and how significant a change it would have on the way physicians do their work. This realization, borne out of the GIM pilot test, led the Project Team to implement three important physician-specific improvements to the methodology that would be used to manage the balance of the project and the successful rollout of MOE/MAR across the organization.

1. Getting Physician Sign-off

Based on experience gained from the pilot test, the Project Team embarked on a program of one-on-one meetings with key physicians from each hospital service during the planning and system development period leading up to the deployment of MOE/MAR in each successive cluster. A first meeting was used to talk about the system and gather any special requirements the physician might have for that particular service. From a usability point of view, for example, the system was designed to minimize the number of mouse clicks and keystrokes required by physicians to perform a function. It was also designed to present as much pre-packaged information or filled-in fields as possible so that physicians would not have to enter any free-form text, a process that is both time-consuming and often error-prone. In a return meeting conducted once the system was designed, a Project Team member would walk the physician through exactly how the legacy paper-based workflow would be mapped into the new electronic MOE/MAR environment. The team member would then get the doctor to "sign off" on this makeshift tutorial, indicating that he/she fully understood the process and agreed with the way in which the system was being implemented. This extra step of getting physician sign-off made it far easier for physicians to accept and support MOE/MAR.

This approach not only ensured that the customization of MOE/MAR for each cluster reflected the needs and work styles of physicians on those wards, but also helped build stronger relationships between physicians and the Project Team and secured greater participation by physicians. Through the building of stronger relationships, physicians were able to see SIMS team members more as "IT experts" with whom they could share information and ideas around business and healthcare issues and clinical workflow, rather than "those people from IT who are always trying to change the system without telling us." The last element, physician participation, became an important indicator of the ultimate success of MOE/MAR from the physician perspective. As such, the greater the physician participation and buy-in, the more smoothly deployment proceeded.

2. Talking to Many Physicians

As an adjunct to the value and need to get physician sign-off to the system design before it was implemented, the pilot test experience also helped the Project Team to realize that no one physician in a particular service can possibly think of all the circumstances governing how the system should be configured for that service. Nor can that one physician represent the views of all the doctors within that service.

The Project Team learned that they needed to involve virtually all physicians in order to test, and often revise, their assumptions about how physicians operate. One of the lessons from the MOE/MAR implementation was that physicians performing the same task on the same ward often do it differently, or in the case of MOE/MAR, might want specific information displayed differently.

On a number of occasions when the Project Team found there to be differing views amongst physicians (e.g., on how some aspect of the MOE/MAR workflow should work, or what a particular drug order set should look like) the physicians were sequestered in a room to develop an agreeable compromise that the Project Team could then implement in the system. These situations produced an unforeseen benefit of allowing hospital practices to be standardized along the lines of industry best practices. However, this only worked effectively when the appropriate physicians participated in the design stage of MOE/MAR.

The Project Team also learned the importance of recognizing when an issue was a "clinical issue," and by implication, should be left to clinicians to resolve. The team did not attempt to become "content" or subject matter experts, but rather facilitators bringing physicians together to make the decisions about what *they* wanted the system to do *for them and their patients*. Additionally, the Project Team needed to play the role of mediator, to ensure that the various wishes of clinicians were compatible with each other. The Project Team also had to ensure that the wishes of clinicians would not exceed the technical and financial constraints of MOE/MAR.

3. Engaging with Physician Champions

Physician "champions" were chosen by senior management from among the physicians in each cluster to work as part of the Project Team during the ramp-up to the MOE/MAR go-live in each cluster. The champions supported the workflow analysis efforts and provided specific information needed by the team for building the system. The champions were also critical when it came to workflow and training issues. As well, they helped with decision-making and "selling" the project to their colleagues.

In the case of the surgical services, a particular medication might be ordered in different ways with respect to dosage,

frequency or route between different surgical specialties. Variations such as these are almost impossible for surgeons of different specialties to anticipate, let alone the SIMS Project Managers or cluster leads.

As a result, physician champions representing each surgical specialty were selected to represent their specialty and gather input from the rest of their division. Regular meetings of these

champions helped ensure that MOE/MAR design choices made to satisfy one specialty would not be to the detriment of others. Although the restricted availability of these busy surgeons made it challenging to convene meetings, communication tools such as e-mail made it possible to disseminate information and solicit feedback in a timely fashion. This also ensured that physicians knew that their feedback had an impact on MOE/MAR system design and implementation.

The pilot test and early cluster rollouts reinforced the importance of the role of champions, clearly demonstrating that champions needed to be committed, enthusiastic people experienced with front-line work. This proved to be a difficult task, but the team quickly discovered that without a savvy champion, it often did not get all the information required in order to properly develop the system. Even when champions were recruited, there were still issues that required prompt attention. Physician champions were chosen based on their problem-solving skills, commitment and availability. The authority and respect these physicians embodied was crucial in getting their peers to buy into proposed solutions. Reluctant colleagues were advised that on-line order entry was a compulsory part of the hospital's clinical practice, not an option. In rare circumstances, they were prepared to escalate the situation to either the Chief of Medicine or Surgery.

During the period leading up to the go-live on each cluster, physician champions had final approval on all decisions being made and were asked to sign off on all project plans, workflows and screen designs, giving them a significant stake in what was taking place on their units.

This extra step of getting physician sign-off made it far easier for physicians to accept and support MOE/MAR.

MOE/MAR Rollout: The Learning Experience Continues

Although there was significantly more physician involvement in the project following the pilot test, and more tailoring of the system by individual services, the project methodology continued to evolve as MOE/MAR was rolled out from cluster to cluster. In some cases it was apparent that unique solutions were required. For example, the vascular surgery service required a system to closely manage anticoagulants. The vascular surgeons found their task was difficult to complete with MOE/MAR. Delegating the drug management task to a pharmacist who was subsequently added to the unit solved the problem. A literature review suggested this as an industry best-practice approach. This example illustrated that system redesign should follow best practices when available, even if it is costlier to do so.

Two other innovations were required for surgical patients. In the operating rooms, wall-mounted PCs were installed to increase workstation availability and to meet space constraints in areas where the addition of a desktop PC was not always possible. In addition, the Patient Transfer Report was developed to accompany patients who change locations within the hospital. It provides details on patient movements, current and pending medications. This was required to accommodate surgical patients who change locations within the hospital. Without this report, the patient could be in a location where medications may not appear on the local MAR.

Consultation Orders Present Impenetrable Barrier

One of the most challenging and contentious issues that had to be addressed – one still not fully resolved – was how to

build a MOE/MAR workflow to accommodate the hospital's practice around Consult Orders. It is presented here in detail as a noteworthy "case study" about trying to map paper-based clinical processes into an on-line environment.

In the pre-MOE/MAR paper world, a Primary Team Physician would ask a consulting service for a consultation on a patient. After the Consult Team saw the patient, a consultation note would be drafted (which may or may not have included a suggested medication order). The consultation note would be added to the patient's chart and the plastic order notification flag would be pulled out as usual, indicating a pending order. Nurses would not execute this order, however, until it was subsequently reviewed and co-signed (sometimes) by the Primary Team.

The benefit of this process was that the Primary Team was able to review the order before it was administered and agree that it made sense given the patient's circumstances. If there were multiple consultations, for example, the Primary Team Physician could resolve any conflicts in suggested orders and decide the best therapy. The downside of this approach was that nurses had to chase after the Primary Team Physicians to review and co-sign the consult orders. If matters needed to be done urgently to manage the patient, sometimes there was simply not enough time to find the physician. In this case, the practice was altered so that nurses would review the order themselves, and if it was from physicians they knew and trusted – and if the order made sense to them – they would go ahead and execute these orders on their own.

Regular meetings of these champions helped ensure that MOE/MAR design choices made to satisfy one specialty would not be to the detriment of others.

Due to limitations in the product software, it was not possible to emulate the consult order process in MOE/MAR. There was no easy way to enter "suggestion" type orders and then have a Primary Team Physician electronically co-sign them to turn them into "real" orders. Since the software was not designed to function in such a manner – and no solution was forthcoming from the product vendor – the hospital had to decide how best to manage the consult order process in the new on-line world.

As a temporary solution, a hybrid approach was chosen: Primary physicians would enter their own orders directly on-line, but the Consult Team would write consult orders on paper. Once co-signed, the consult orders would need to be entered on-line; it was initially agreed that pharmacists would do this during Pharmacy hours, and the On Call team would do the order entry outside Pharmacy hours. The downsides of this hybrid process were that the paper orders were continually being missed; nurses still had to chase physicians to co-sign the orders; and at night, the covering On Call team members sometimes felt they did not know enough about the patient to co-sign and enter these orders. As more and more wards came on-line with MOE/MAR, pharmacists started complaining that because they could not manage the growing volume of consult orders that needed to be entered, they could no longer play this role. Another solution was needed.

After the situation was reviewed with multiple services, the Medical Advisory Committee and everybody else that needed to see it, it was decided that if the orders were "urgent or emergent" (i.e., needed to be done right away to help the patient), the Consult Team would enter the order directly into MOE/MAR at the time of the consultation and then contact the Primary Team via pager to let it know what had been done. If the situation was not urgent/emergent, the Consult Team would page the Primary Team to discuss what they wanted to do, and if there was no disagreement, the Consult Team would then enter the order on-line. If Consult Team members were unable to reach the Primary Team, they would go back to writing the suggested order on paper. This is what was *supposed* to happen. But what actually happened is that because of the difficulty and time it was taking the Consult Team to reach the Primary Team to discuss a suggested order, team members typically just skipped that step and wrote the order on paper just as they had done before. This resulted in very few consulting physicians entering orders on-line. Once again, a familiar problem emerged: Who would enter all the orders on-line? And there was the risk that the paper order might be missed altogether by the nurses, especially if the order sheet in the patient's chart filled up and the nurse flipped to a new page, leaving the unfinished consult order on the previous page.

Indeed, far from being an adequate solution, such a hybrid approach increased the risk of errors and omissions – and failed to fully leverage all the benefits of on-line order entry. It was also confusing to physicians and to nurses to have some services entering orders on-line while others were writing them on paper. The resulting process was not conducive to improved patient care and continues to be examined by the Project Team to this day. The lesson learned here: If an on-line order entry system cannot support a particular process or workflow item, then it is critical that everyone who has anything to do with that process be consulted, so that they can combine forces to resolve the problem together. Getting participation and support from all parties is key.

Managing Physician Expectations

Physicians developed their own expectations in terms of what

a hospital information system should be able to do based on what they see in the media, read in industry journals and hear from colleagues. The Project Team had to address these expectations and communicate whether they could be met and in what period of time.

User expectations were met with the help of the Medical Informatics Team and front-line physician champions through the following:

- Communicating openly and honestly to physicians about what the system will and will not do. Physicians did not want to feel "tricked."
- Advising that change is initially difficult, and that ultimately the system may not do everything they want it to.
- Telling them the system is not perfect, but that it will be a lot better than what they had before.
- Setting realistic expectations.
- Being prepared for physician complaints about unfulfilled expectations.

Ultimately, the Project Team successfully worked with Medical Informatics physicians to increase the level of peer-to-peer communications among physicians in the form of positive support for the system that grew in magnitude over the course of the rollout.

Tangible Benefits Keep Doctors Motivated

For other hospitals considering a MOE/MAR implementation, we believe hospitals need to be prepared for physician resistance, which may take the form of enduring opposition (e.g., Cedars-Sinai) or initial hesitancy and suspicion.

For the physicians, additional benefits included

- *clinical decision support:* Although not fully operational with the MOE/MAR system at time of writing, this capability prevents physicians from making a drug prescription error. It helps them make the right decision at the right time for the right patient.
- *saved time for physicians overall:* All the information needed to manage a patient is visible in a single place – namely, on the MOE/MAR screen – rather than the physician having to retrieve different bits of patient information from different documents in different places (paper patient chart, paper MAR, kardex files, etc.).
- *anywhere access:* Physicians can now manage patients from anywhere there is a computer terminal in the hospital or remotely from offsite (e.g., home) instead of having to go to the ward to write the orders. SIMS is making available remote access on all services to ensure access to staff and resident physicians on a 24/7 basis.

Lessons Learned

1. Ordering medications differs from ordering laboratory or imaging tests. There is no universal way in which physicians order medications for their patients.
2. The practice patterns of physicians and their availability to interact with nurses and pharmacists to solve problems – not the complexity of the patients – determines the difficulty of implementing MOE/MAR.
3. A new system may perform extremely well in a development environment, but be prepared for unpredictable things to happen when going live. For this reason, it is crucial to test systems in a production environment.
4. Involve physicians as well as nurses and pharmacists in the early stages of requirements definition, system design and usability testing.
5. Do not underestimate the degree to which MOE/MAR will require physicians to change the way they currently work.
6. Obtain physician participation and buy-in by engaging them in proposed project plans, workflows, screen designs and having them sign-off to their agreement. The greater the physician participation and buy-in, the more smoothly the deployment will go.
7. Engage as many physicians as possible. No one physician can represent the views of all others.
8. Early efforts devoted to rendering the ordering process faster or more efficient will result in greater satisfaction by physicians, with improved cooperation and buy-in as the implementation proceeds.
9. Physician champions must have credibility and be respected by their peers as advocates for both clinician and patient interests. Better results will be achieved in those areas with strong physician champions.
10. Implement a common workflow across services wherever possible, but expect physicians to need customization in certain circumstances.
11. Executive-level support is critical to reassure physicians that there is commitment at the highest levels to make this work. Executive-level discipline should only be used as a last resort to deal with resistance. The need to resort to executive authority may mean that there is a fundamental design or process problem that needs to be fixed.
12. Expect physicians to be reluctant to adopt MOE initially since using the system will slow them down. As such, they will need to be shown some personal benefits that transcend patient safety.
13. Be proactive about managing user expectations. Communicate clearly to physicians about what MOE/MAR can and cannot do.
14. Peer-to-peer communications among physicians will play a big role in setting realistic expectations.
15. Monitor the system closely for safety and efficiency of care.

- *staff supervision:* Remote access also makes it easier for staff and senior residents to supervise junior colleagues by monitoring their activity. It is generally acknowledged that things get missed when staff are busy, but it is easier to catch potential slip-ups when tasks are done and recorded electronically. For example, a physician can remotely review lab or radiology results as a basis for querying house staff on their activity/progress.
- *reduced workload:* Once patient information has been entered into the system, it should never have to be re-entered. For example, allergy information in a patient's EMR is instantly available to the pharmacy and hospital information systems for automated drug-allergy checking. Or, when creating a discharge summary, all the test results, diagnoses, etc., are in the system already and thus should be available for automatic download into the summary instead of requiring a clinician to re-enter all this data manually.

Notably, for some physicians, motivation also comes from being able to work on the leading edge in a relatively new area such as on-line medication management. This can be an important source of pride and satisfaction, and even part of their professional identity.

Future Holds Even Greater Promise

All stakeholders (with the exception of patients) experienced considerable growing pains when it came to the implementation of MOE/MAR. However, now that MOE/MAR is a daily fact of life at UHN, original concern and hesitance have gradually turned to widespread acceptance with the goal of substantially reducing medication errors and adverse events.

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Commentary

Implementation Is an Iterative Process

Ben Davoren

"Clinical Informatics is not a spectator sport," noted Dr. Randy Miller, Professor of Biomedical Informatics at Vanderbilt University, many years ago. The essence of that quote is borne out in the description of the Computerized Physician Order Entry (CPOE) project at Toronto's University Health Network in this journal. It is also borne out in the experience of developing and deploying North America's most widely utilized electronic medical record, the Veterans Health Administration's (VHA) Computerized Patient Record System (CPRS). The most critical elements of CPRS's success have not been technical advances; rather, the involvement of field-based participants – physicians, nurses, pharmacists and other medical centre support staff – has been the key. In fact, the origins of CPRS were not even supported by the national VHA structure of the late 1970s when the computerization effort started. As recounted in the book *Computerizing Large Integrated Health Networks* by Dr. Robert Kolodner (current VHA Chief Health Informatics Officer), an "underground railroad" of clinical users in VA promulgated the development of a clinical information system along with critical programming staff. This user-driven system evolved into CPRS over a period of nearly 20 years.

Why is it so critical that front-line clinicians become intimately involved in the implementation of a computerized patient record system? The answers are manifold, but they can be divided into a few key areas. First, "implementation" of a provider order entry system is not an event. There are no ribbons to cut at a CPOE ceremony because implementation is never "done." Rather, it is an iterative process. The workflow of one group of healthcare providers will be different from another, and each will fit differently into the pathways that the software has created. The software will then have to be readjusted. As the providers adapt to the software, their own workflow will change, and new modifications to the software will again be necessary.

In VHA, CPRS is currently in Version 26, after its original testing and distribution in 1997. It is a nationally programmed application, with one new substantial version every four to six months, each of which needs to be tested, validated and then deployed across more than 160 medical centres and 600 outpatient clinics, with new training and support resources involved at each step. Having clinical champions heavily involved is crucial to the success of this process.

Second, computers are ruthless enforcers of rules – that's their real power in impacting clinical care – but they don't care what the rules are. In healthcare, practice patterns have evolved to such a point that no one person actually knows what all the rules are, at least not enough to guide programmers. They just know what they do. Front-line clinicians need to meet, discuss, bribe, cajole and then come to a consensus on what the rules are. Our experience has been that rules frequently have to be created in situations where we didn't know we needed any. Not only is clinical informatics not a spectator sport, it is a contact sport!

Third, healthcare really is different from other industries. Complex decision-making, non-linear workflow, shared responsibilities, extreme time-sensitivity of information flow and recognition of previously unrecognized patterns define medical care in the 21st century. Programmers and other technical staff have much to learn from clinicians. By and large, programmers enjoy it and can deliver better products and systems when clinicians can work with them to demonstrate what it is they really need to accomplish to take good care of other human beings.

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Commentary

Project Must Be Physician Led

Bill Fera

Many of the lessons learned and advice regarding the implementation of CPOE at UHN are eerily similar to the experience at UPMC (University of Pittsburgh Medical Center) St. Margaret Memorial Hospital. St. Margaret successfully launched a CPOE project in September 2004, achieving 100% compliance with physician order entry within one month. The only place where paper orders exist is where computer order entry is cumbersome or not well supported by the software, such as dialysis and chemotherapeutic regimens.

Similar to UHN, we believe our key to success was having the project be physician led. In no way was CPOE ever promoted as an information technology project. It was always a physician-led quality initiative. One of the key strategies in this regard was the appointment of a chief medical informatics officer. The CMIO was responsible for assembling a Physician Advisory Committee as well as recruiting and assigning tasks to other physician leaders.

A second key component in the physician engagement strategy was that all training was physician led. One physician was assigned to oversee training. This physician helped to develop all training materials and recruit and teach other "super user" physicians to lead all training. In every training session, there was a super user present to answer questions and help frame things in a context that physicians would understand.

This diversified physician leadership worked hand in hand with administration as well as with the CMO and all other physician leadership to promote CPOE as a physician-led quality initiative and was the main key to success at St. Margaret Hospital.

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